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IS 8422-9 (1986): Piston rings for IC engines, Part 9:
Terms and Definitions [TED 2: Automotive Primemovers]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

(Reaffirmed 2002)

PISTON RINGS FOR INTERNAL COMBUSTION ENGINES

PART 9 TERMS AND DEFINITIONS

1. Scope — This standard covers the terms and definitions applicable for various types of piston rings used in internal combustion engines. In addition, the classifications based on configuration as well as measuring devices have also been covered.

2. Classification

2.1 A broad classification of piston rings together with the criteria for classification is given on page 2.

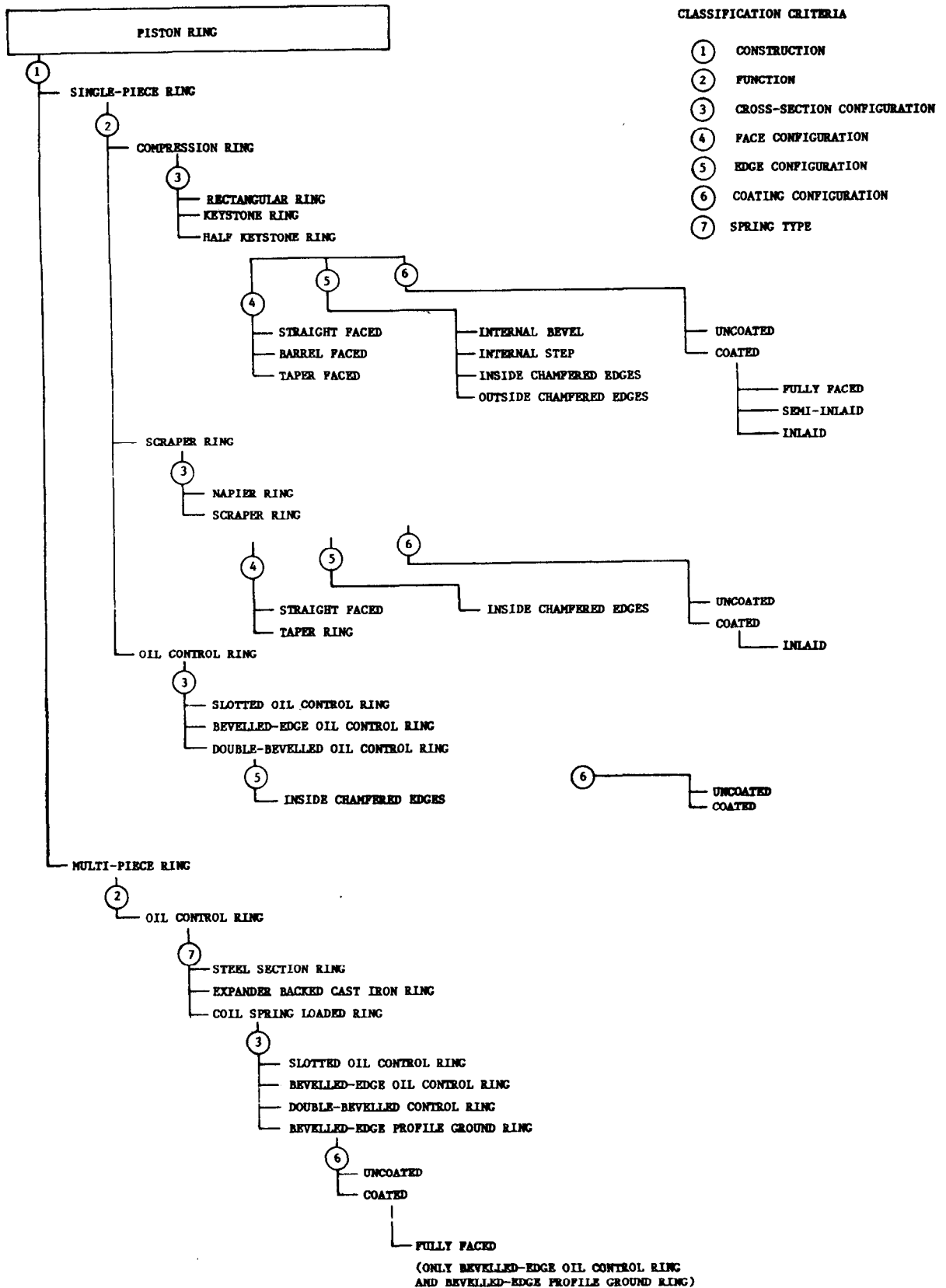
Internal Combustion Engines Sectional Committee, EDC 14, Piston Assembly Components Subcommittee, EDC 14 : 1 [Doc : EDC 14(4614)]

Adopted 16 December 1986

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Gr 6

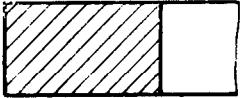
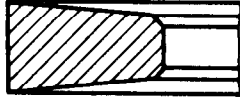
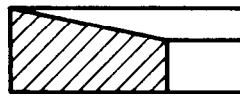
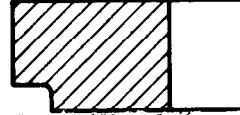
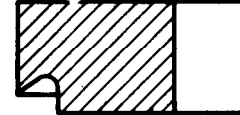
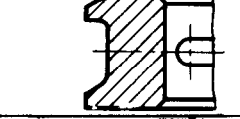
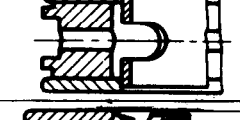
PISTON RING CLASSIFICATION



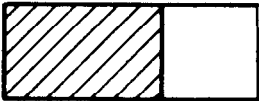
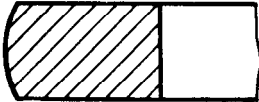
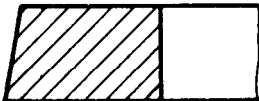
3. Ring Types

3.0 The different types of rings together with their configuration shall conform to the following:

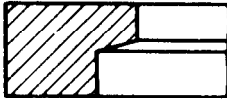
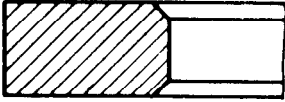
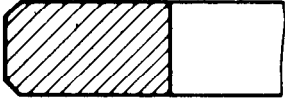
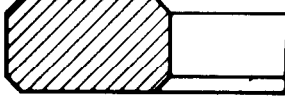
3.1 Cross-section Configuration

3.1.1 Rectangular ring — R ring	Compression rings	
3.1.2 Keystone ring — T ring		
3.1.3 Half keystone ring — Wedge type IT ring		
3.1.4 Scraper ring (stepped) — Z ring		
3.1.5 Napier ring (undercut step) — N ring		
3.1.6 Slotted oil control ring — S ring	Oil control rings	
3.1.7 Bevelled-edge oil control ring — D ring		
3.1.8 Double-bevelled oil control ring — G ring		
3.1.9 Coil spring loaded slotted oil control ring		
3.1.10 Coil spring loaded bevelled-edge oil control ring		
3.1.11 Coil spring loaded double-bevelled oil control ring		
3.1.12 Expander backed cast iron ring		
3.1.13 Multi piece steel ring		

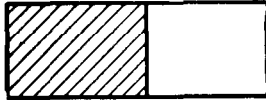
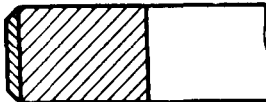
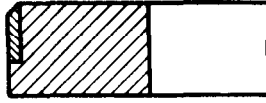
3.2 Face Configuration

3.2.1 <i>Straight faced</i>	
3.2.2 <i>Barrel faced</i>	
3.2.3 <i>Taper faced — M ring</i>	

3.3 Edge Configuration

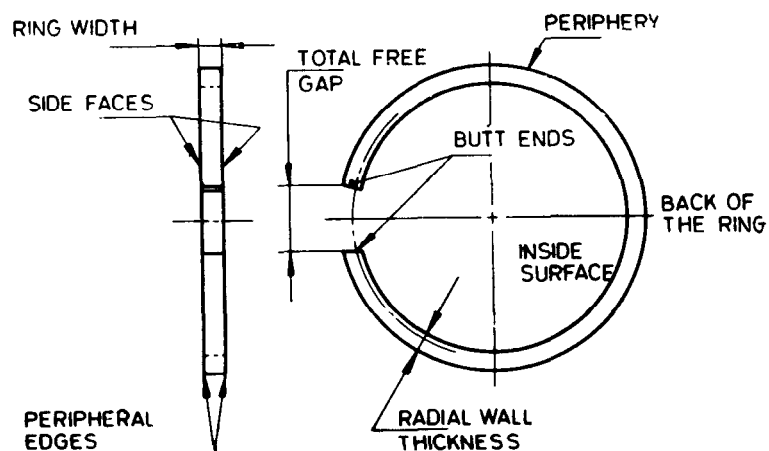
3.3.1 <i>Internal bevel top (positive twist type) — IF ring</i>	
3.3.2 <i>Internal step top (positive twist type) — IW ring</i>	
3.3.3 <i>Internal bevel bottom (negative twist type)</i>	
3.3.4 <i>Internal step bottom (negative twist type)</i>	
3.3.5 <i>Inside edges chamfered</i>	
3.3.6 <i>Outside edges chamfered</i>	
3.3.7 <i>Inside and outside edges chamfered</i>	

3.4 Coating Configuration

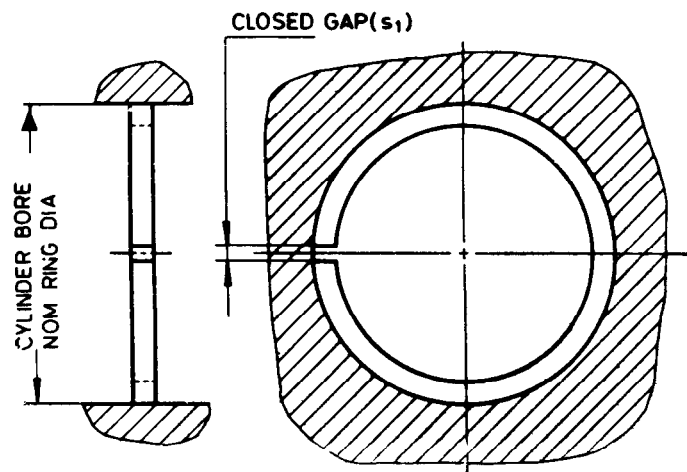
3.4.1 <i>Uncoated</i>	
3.4.2 <i>Coated</i>	
3.4.2.1 <i>Fully faced</i>	
3.4.2.2 <i>Semi-inlaid</i>	
3.4.2.3 <i>Inlaid</i>	

3.5 Joint Configuration

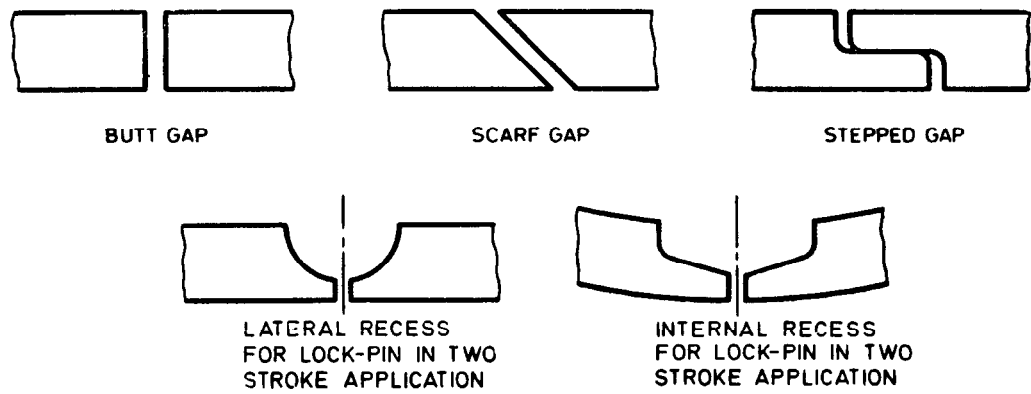
3.5.1 <i>Joint with side notch</i>	
3.5.2 <i>Joint with internal notch</i>	

4. Piston Ring Nomenclature**4.1 Free (Unstressed) Ring**

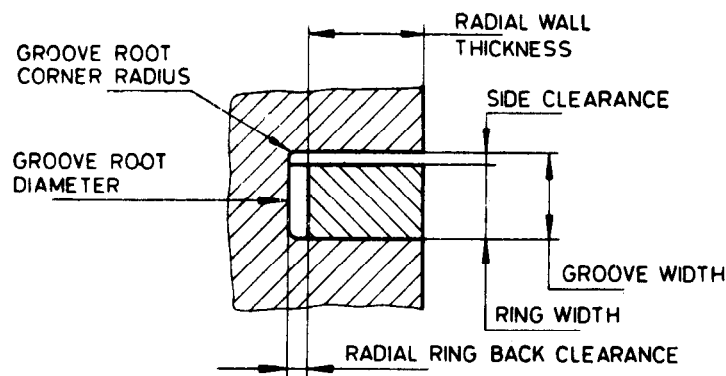
4.2 Closed Ring



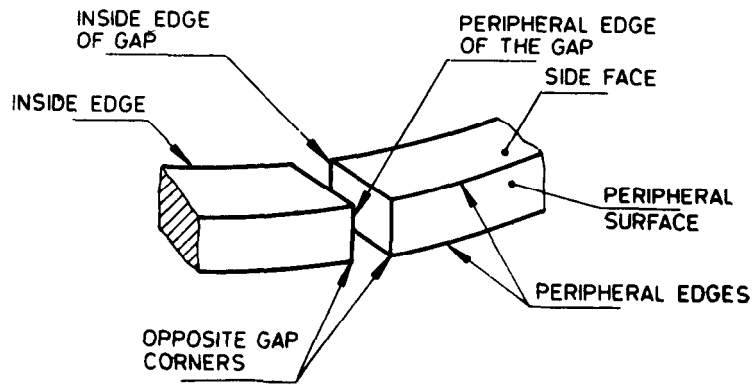
4.2.1 Types of ring gaps



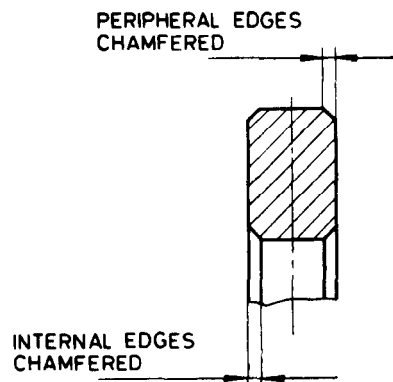
4.3 Ring Clearances



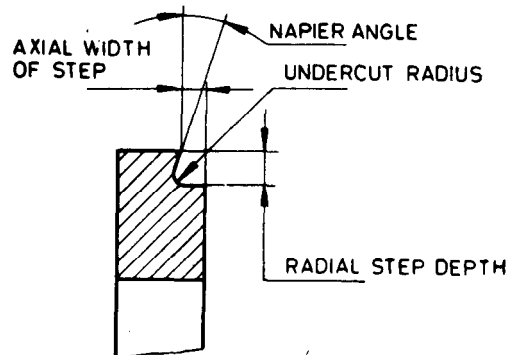
4.4 Edges, Surfaces and Face



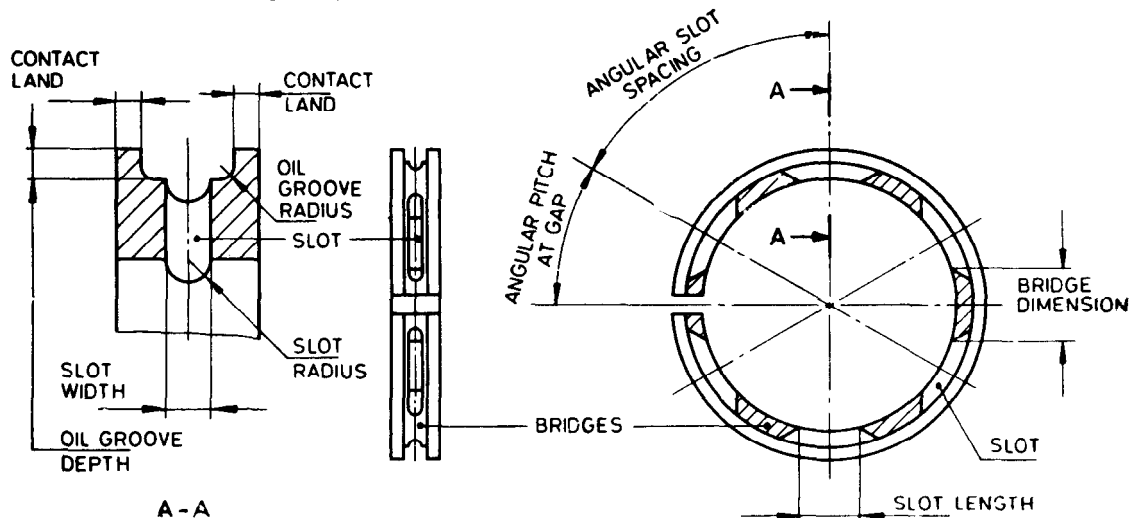
4.5 Enlarged Section of Straight Faced Rectangular Ring (Type R)



4.6 Enlarged Section of Napier Ring (Type N)



4.7 Slotted Oil Control Ring (Type S)



5. Terms and Definitions

<i>No.</i>	<i>Term</i>	<i>Definition</i>
5.1	<i>Piston Ring</i>	A metallic circular spring with a high relative outward expanding strain. It fits into an annular groove adapted to its section. The reciprocating and/or rotating piston ring seals against a pressure differential of gases or liquids between the ring face and a cylinder bore and one side of the ring and groove.

6. Types of Piston Ring

6.1	<i>Single-piece Ring</i>	A ring formed from only one part which is intended for installation in a single ring groove.
6.2	<i>Multi-piece Ring</i>	A ring comprising two or more component parts which are intended for installation in single ring groove.
6.3	<i>Compression Ring</i>	A ring intended primarily to prevent the leakage of gas past the piston.
6.4	<i>Oil Control Ring</i>	A ring having oil return slots or the equivalent and intended to scrape oil from the cylinder wall.
6.5	<i>Rectangular Ring</i>	A compression ring with a rectangular cross-section; with its geometrically simple form, it provides an adequate seal under normal operating conditions.
6.6	<i>Keystone Ring</i>	A compression ring with both sides tapered; it is used in those cases where ring sticking can be expected. Due to its wedge shape, any radial movement of the ring will alter its axial clearance and thus minimize the build-up of combustion residues.
6.7	<i>Half Keystone Ring</i>	A compression ring with one side tapered. Usually the tapered side is the one which faces the combustion chamber.
6.8	<i>Scraper Ring (Stepped)</i>	A ring which does not have slots; it is intended primarily to scrape oil from the cylinder wall. It can also act as a lower compression ring.

No.	Term	Definition
6.9	<i>Napier Ring (Undercut Step)</i>	A scraper compression ring with an undercut step that also scrapes oil from cylinder wall.
6.10	<i>Slotted Oil Control Ring</i>	A slotted oil control ring with parallel sides and two contact lands. Due to the narrow lands of this type of ring, a high unit pressure is achieved.
6.11	<i>Bevelled-Edge Oil Control Ring</i>	A ring where the outside edges of both lands are chamfered, in order to achieve a further increase in unit pressure and thereby a better oil scraping effect.
6.12	<i>Double-Bevelled Oil Control Ring</i>	A ring similar to type 6.11 but by chamfering the edges of both lands in the same direction, the oil scraping effect is even further improved.
6.13	<i>Coil Spring Loaded Slotted Oil Control Ring</i>	An oil control ring the radial pressure of which is increased by means of a cylindrical coil spring. This spring acts equally in all directions against the inside of the ring.
6.14	<i>Coil Spring Loaded Bevelled-Edge Oil Control Ring</i>	A coil spring loaded oil control ring with both lands chamfered.
6.15	<i>Coil Spring Loaded Double-Bevelled Oil Control Ring</i>	A coil spring loaded oil control ring with both lands chamfered in the same direction.
6.16	<i>Coil Spring Loaded Bevelled-Edge Profile Ground Oil Control Ring</i>	A coil spring loaded oil control ring with both lands chamfered and profile ground.
6.17	<i>Expander Backed Oil Control Ring</i>	An oil control ring the radial pressure of which is increased by means of a formed steel expander. The expander acts against the inside periphery of the ring and piston groove root.
6.18	<i>Multipiece Steel Suction Ring</i>	An oil control ring comprising of a pressed steel expander and spacer supporting steel rails that act as oil scraping element.

7. Physical Characteristics of Rings

<i>No.</i>	<i>Term</i>	<i>Definition</i>
7.1	<i>Nominal Rings Diameter</i>	The nominal diameter is identical to the nominal cylinder bore.
7.2	<i>Witness Land</i>	A small continuous land of contact lapped on the periphery of the ring, which can be seen around the circumference with normal vision.
7.3	<i>Joint</i>	The joint at the butt ends of the ring
7.4	<i>Butting</i>	An effect which occurs when the ends of the ring touch.
7.5	<i>Effective Free Gap</i>	The total gap (see 4.1), minus the measured closed gap (see 4.2); it is the free gap used in the formulae for the calculations of <i>E</i> value, tangential and diametral forces and stresses.
7.6	<i>Pressure Pattern</i>	The radial pressure distribution around the circumference of the ring when closed in its nominal cylinder bore.
7.7	<i>Pin Point or Burry Light</i>	Intermittent pin points of bright light or hazy light, and not bright direct light.

8. Piston Part

8.1	<i>Ring Groove</i>	The groove in the piston in which the piston ring is installed.
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9. Measuring Devices

9.1	<i>Ring Gauge</i>	A solid annular gauge having an inside diameter of nominal cylinder bore.
9.2	<i>Datum Surface</i>	The plane on which the ring lies for measurements, except where otherwise specified.

EXPLANATORY NOTE

While preparing this Indian Standard assistance has been derived from ISO/DIS 6621/1 'Internal combustion engines, piston rings, Part 1 Vocabulary', prepared by the Technical Committee for Road Vehicles, ISO/TC 22.

The other parts of this standard on piston rings cover the specific requirements for different types of rings.

Reference has also been made to BS 5341 : Part 1 : 1976 'Piston rings up to 200 mm diameter for reciprocating internal combustion engines, Part 1 Design, dimensions, materials and designations for single piece, rings'.